EXHIBIT J

PRELIMINARY TECHNICAL REPORT

regarding the

SIOUX STEEL HOPPER INCIDENT

Prepared by:

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A. INTRODUCTION

Sioux Steel Company (Sioux Steel) manufactures and provides steel products for the farming and agricultural markets; some of their products include feed bins, fencing and feeders for livestock as well as commodity (grain) storage bins of all sizes. After deciding to add a hopper discharge system to the bottom of some of their storage bins, Sioux Steel contacted KC Engineering, P.C. (KCE) to perform an engineering analysis of the new hopper assembly that was going to be incorporated into those grain storage bin designs.

KCE performed an engineering analysis on the hopper assembly for Sioux Steel's 18 and 30 foot diameter bins and the results of their analysis were coordinated with Sioux Steel for the purpose of manufacturing a new bin/hopper commodity storage product that was then offered for sale by Sioux Steel.

One such bin/hopper assembly was sold for the purpose of grain storage and was assembled in Tepic, Mexico. On the morning of February 2, 2015, soon after the process of discharging its stored soybean meal (soymeal) contents began, that hopper catastrophically failed and its stored contents were then released in an uncontrolled manner. Two workers positioned at the base of the hopper during this operation were killed as a result of the hopper's structural failure and the rapid and uncontrolled commodity discharge.

The purpose of my investigation was to determine if the actions of KC Engineering, P.C. fell below the applicable standards of care for engineering, and if so, to also determine if those standard of care violations were causative in any manner to the structural failure of the incident hopper assembly and the subsequent deaths of the two workers.

My investigation into this matter and the preparation of this report was performed at the request of Mr. Verne Goodsell Esq., Goodsell Quinn LLP.

B. MATERIALS AVAILABLE FOR REVIEW

1. Complaint.
2. Answer.
3. Protective Order.
4. Plaintiff's Production to Defendant (index; 12/30/15).
5. Defendant's Initial Disclosures (12/31/15).
6. Plaintiff's Objections to and Answers to Defendant's First Set of Interrogatories and Responses to Requests for Production of Documents to Plaintiff (03/14/16).
7. "Preliminary Report, Sioux Silo Failure Investigation, Tepic, Mexico" by ESI, dated May 11, 2105.
8. "Engineering Investigation Report on Collapse Cause and Origin, Sioux Steel Hopper Bin", by Nohr Engineering Company, LLC, dated March 3, 2015.
9. Numerous color photos taken of the failed hopper after the incident.
10. Numerous emails between KC Engineering and Sioux Steel.
11. Proposals, by KCE to Sioux Steel, for the structural engineering analysis for the 18 and 30 foot diameter hoppers, one dated 07/30/2012 and the other dated 02/06/2103.

12. August 28, 2012 letter and October 2, 2102 letters from KCE to Sioux Steel regarding the results of their engineering analysis of the bin/hopper assembly.
13. Numerous calculations by KCE regarding their engineering analysis for Soiux Steel's bin/hopper assembly.
14. Numerous manuals from Sioux Steel for their products: "Owners/User's Manual", Erection Manual", Hopper Bin Material Specifications", parts lists, etc.
15. Hard copies of portions of the 3D model used for the bin/hopper assembly.
16. Miscellaneous invoices.
17. Information on air cannons used on the incident bin.

C. BACKGROUND

Sioux Steel Company is a fourth-generation, family owned business in Sioux Falls, SD that started in 1918. It manufactures steel products for farmers and the agricultural industry in general. In addition to offering "livestock solutions" (fencing, feeders, gates, etc.) and engineered multi-use storage buildings, they also manufacture commodity storage bins. Their storage bins are offered in many different configurations and sizes, for both the individual farmer as well as for commercial use.

At some point in time, Sioux Steel decided to add a new product to their inventory; a steel hopper assembly connected to their 18 and 30 foot diameter steel bins. The hopper is a cone-shaped assembly attached to the bottom of their cylindrical bins to facilitate the discharge of the commodities stored in those bins. The hopper is comprised of multiple steel panels field bolted together at their intersections and to the bottom of the cylindrical bin (vertical and horizontal seams).

After the decision was made to add a hopper assembly to the bottom of their 18 and 30 foot diameter bins, Sioux Steel contacted a local consulting structural engineering firm, KCE, regarding a structural analysis for the new hoppers. Sioux Steel retained KCE to perform the engineering analysis; KCE completed the structural analysis on the two hoppers and their findings were relayed back to Sioux Steel. Sioux Steel then fabricated the components for the bin/hopper storage configurations and the product was offered for sale.

One such hopper/bin assembly, a 30 foot diameter configuration, was sold to Agropecuaria El Avion for the handling, storage and delivery of soymeal. The bin/hopper combination was erected at the Agropecuaria plant in Tepic, Mexico. On February 2, 2015, workers at the plant started the process of emptying the soymeal contents from that bin/hopper early in the morning; two Agropecuaria workers were positioned at the base of the hopper to facilitate that process.

Soon after the process began, however, the vertical seams of the steel panels comprising the upper portion of the hopper split apart and the soymeal commodity was rapidly and violently released in an uncontrolled manner. The two Agropecuaria workers positioned at the base of the hopper were killed as a result of the uncontrolled release of the material from the storage bin.

D. ANALYSIS

Sioux Steel provided KCE drawings of the proposed hoppers, along with cut sheets of their constituent components (shop drawings) and a 3-D computer model for KCE's use in performing their structural analysis of the hopper structure.

KCE performed their analysis utilizing the ANSI/ASAE EP433 Standard: "LOADS EXERTED BY FREE FLOWING GRAINS ON BINS"; this Standard is an industry accepted Standard that establishes minimum design criteria for the safe design of bins and hoppers. I also performed a similar analysis on the Sioux Steel 30 foot hopper configuration using the same EP433 Standard and I obtained similar results as obtained by KCE for *portions* of the hopper.

KCE's analysis utilized a commodity density of 55.3 pounds per square foot (psf); it is my opinion that this material density is a prudent and reasonably conservative value to be used for their analysis. The material density used in a bin/hopper analysis defines the loading for that storage structure; a higher density correlates to a more conservative design (ie, a stronger vessel) and, theoretically allows for a greater variety of grains to be stored in that vessel during its lifetime. The EP433 Standard, Section 5.5 indicates that "*If a bin is to be used to store a variety of grains over its lifetime, it is recommended that it be designed for the storage of wheat.*" The USDA, in their Economic Research Publication, Agricultural Handbook Number 697, "*Weights, Measures, and Conversion factors for Agricultural Commodities and Their Products*" list the densities for both wheat and soybeans as 48.2 psf, both certainly are below the 55.2 psf density value used by KCE to analyze Sioux Steel's bin/hopper assembly.

As evidenced by its title, the EP433 standard is for "*Loads Exerted by Free-Flowing Grains on Bins.*" The ability of a grain/commodity to flow freely within a bin and/or hopper is a function of its angle of repose. The angle of repose of a granular material is the steepest angle of descent relative to the horizontal plane to which the material can be piled without slumping. At this angle, the material is one the verge of sliding. Numerous publications address the angle of repose for soymeal. Two examples of technical publications on this matter are:

- "*Mechanical Properties of Corn and Soybean Meal*", published in the 2002 American Society of Agricultural Engineers, Vol. 45(6): 1929-1936...lists as the angle of internal friction (angle of repose) for soybean meal as 33.9 degrees, plus or minus 0.9 degrees.
- "Physical Properties of Soybean Meal", published in the 1995 American Association of Cereal Chemists, Vol. 72. No. 6, 1995...lists as the repose angle for soybean meal, at differing moisture contents, as range of 30.3 degrees to 33.2 degrees.

Commodities with angles of repose between 30 and 40 degrees are defined as Free Flowing. Therefore the use of soymeal in the incident bin/hopper represents a reasonable use for that storage container and that usage fell within the design parameters originally used by KCE in their analysis.

KCE, in their engineering analysis of Sioux Steel's bin/hopper assembly, appropriately included the "overpressure factor" of 1.4, as referenced in the EP433 standard. This overpressure factor accounts for the potential of plug flow within the bin and hopper, thus addressing the higher dynamic forces that may occur as a result of plug flow vs. the lower static forces associated with funnel flow.

One area where my calculations were markedly different, however, from those prepared by KCE was that of the bolted connections along the vertical sides of the steel panels comprising the upper portion of the hopper assembly. These vertical seams have 5/8" diameter bolts spaced at 3" c/c and, in some cases, a very short edge distance between the bolt holes and the edges of the panels. Using the forces I calculated utilizing the EP433 Standard, I found that some of the bolted connections were inadequate to resist the imposed forces and were, thus, unsafe. The forces in the hopper's panels and in the bolted connected at the panel-to-panel connections were highest near the top of the hopper. **There is no evidence that KCE checked these connections.**

A review of the material provided to me in this case, particularly the photographs depicting the failed steel hopper, evidenced a failure of the bolted connections along the vertical seams near the top of the hopper. A close examination of the failed surfaces (ie, sides of the steel panels that were bolted together) evidenced a bearing type failure at the bolt locations; bearing type failures at panel edges are highly dependent upon the edges distances for the bolt holes.

The incident steel hopper failed catastrophically when the bolted connections along the sides of its constituent steel panels failed. The failure likely initiated near the top of the hopper where the forces on the bolts were highest.

Conformance with minimum design criteria established by industry Standards is how safe structural design is ensured. Structures that support loads must be engineered. Standards exist that provide clear and explicit direction as to the engineering methods to properly design structures. In addition to the EP433 Standard is the Standard issued by the American Society of Civil Engineers (ASCE) 7-10.[1] In Section 1.3.1.1 "*Strength Procedures*" of ASCE 7-10, it indicates that "*Structural and nonstructural components and their connections shall have adequate strength to resist the applicable load combinations...without exceeding the applicable strength limit states for the materials of construction*". The hopper assembly was constructed out of steel, a material with well-defined properties and for which explicit engineering formulas for their safe design are found in the American Institute of Steel Construction (AISC) Steel Construction Manual.[2] In the AISC Steel Construction Manual, **minimum** edge distances are listed as well as formulas provided for calculating the allowable forces at the bolted connections along panel edges with a given edge distance.

My calculations indicated that the bolted panel-to-panel connections failed due to inadequate bearing strength at the holes of the connected members. The bearing strength of a bolted connection is directly (linearly) related to the edge distance at the bolts. The two different types of (upper) steel panels created 4 unique sides that were connected (bolted) together to create the vertical seams. There were at least 3 different edge distances used on those 4 unique sides and only one panel's edge distance met the AISC Standard for minimum edge distance.

The failure of the hopper's bolted connections along its vertical "seams" was due to inadequate edge distances at those sides of the steel panels. In most cases, the edge distances along the side of the panels were less than the minimum distances required by applicable Standards.

[1] Minimum Design Loads for Buildings and Other Structures; ASCE Standard 7-10, as published by the American Society of Civil Engineers, developed in conjunction with ANSI (American National Standards Institute) and the SEI (Structural Engineering Institute); 2010 edition.
[2] American Institute of Steel Construction (AISC), Steel Construction Manual.

Steel structures, such as the incident steel hopper, are required by industry standards to be designed and engineered to safely resist the forces and stresses imposed on their constituent members and their connections.

The reason that my calculations were markedly different from those prepared by KCE relative to the bolted connections at the panel seams was that there is no evidence submitted to indicate that KCE checked those connections; **KCE simply failed to perform those calculations**. KCE's calculations "stop" at the bolted connections of the top of the steel panels where they are bolted to the bent plate creating the transition from the vertical surface of the bin to the inclined surface of the hopper (ie, horizontal seam). However, their calculations then "jump" to another analysis and never come back to the vertical seam bolted connections, despite the fact that their hand sketch for the connections for the horizontal seam pictorially and schematically includes the vertical seam bolts.

KC Engineers, P.C. failed to address, in any manner, the structural capacity of the bolted connections of the vertical seams along the sides of the hopper's steel panels. It is likely that, had KCE addressed the bolted connections along the panel's vertical seams, they would have properly addressed the structural inadequacies at those connections and the structural failure of the hopper would not have occurred.

The omission by KC Engineers, P.C. to analyze, in any form, the hopper's (vertical seams) bolted panel connections constitutes a failure, on their part, to meet the minimum standard of care for engineers performing an engineering analysis for a steel structure.

The omission by KC Engineers, P.C. to analyze, in any form, the hopper's (vertical seams) bolted panel connections was the proximate cause of its structural failure and the subsequent deaths of the two Agropecuaria workers.

E. FINDINGS

Within the bounds of reasonable technical certainty, and subject to change if additional information becomes available, it is my professional opinion that:

1. The incident steel hopper failed catastrophically when the bolted connections along the sides of its constituent steel panels failed. The failure likely initiated near the top of the hopper where the forces on the bolts were highest.

2. The failure of the hopper's bolted connections along its vertical "seams" was due to inadequate edge distances at those sides of the steel panels. In most cases, the edge distances along the side of the panels were less than the minimum distances required by applicable Standards.

3. Steel structures, such as the incident steel hopper, are required by industry standards to be designed and engineered to safely resist the forces and stresses imposed on their constituent members and their connections.

4. KC Engineers, P.C. failed to address, in any manner, the structural capacity of the bolted connections of the vertical seams along the sides of the hopper's steel panels. It is likely that, had KCE addressed the bolted connections along the panel's vertical seams, they would have properly addressed the structural inadequacies at those connections and the structural failure of the hopper would not have occurred.

5. The omission by KC Engineers, P.C. to analyze, in any form, the hopper's (vertical seams) bolted panel connections constitutes a failure, on their part, to meet the minimum standard of care for engineers performing an engineering analysis for a steel structure.

6. The omission by KC Engineers, P.C. to analyze, in any form, the hopper's (vertical seams) bolted panel connections was the proximate cause of its structural failure and the subsequent deaths of the two Agropecuaria workers.

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